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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/613,307

07/07/2003

Ellis D. Harris

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7590

10/20/2004

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EXAMINER

CRUZ, MAGDA

ART UNIT

PAPER NUMBER

2851

DATE MAILED: 10/20/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/613,307

Applicant(s)

HARRIS ET AL.

Examiner

Magda Cruz

Art Unit

2851

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-17 is/are rejected.
- 7) ☒ Claim(s) 4 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 07 July 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. This application has been filed with informal drawings, which are acceptable for examination purposes only. Formal drawings will be required when the application is allowed.
2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "light pipes are cylindrical" (claim 14) must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will

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be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

3. In addition to Replacement Sheets containing the corrected drawing figure(s), applicant is required to submit a marked-up copy of each Replacement Sheet including annotations indicating the changes made to the previous version. The marked-up copy must be clearly labeled as "Annotated Marked-up Drawings" and must be presented in the amendment or remarks section that explains the change(s) to the drawings. See 37 CFR 1.121(d). Failure to timely submit the proposed drawing and marked-up copy will result in the abandonment of the application.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

5. Claims 1- 7 are objected to because of the following informalities:

a. In claims 1-6, the applicant claims a "method", however, only the structure of the display is recited. Hence, it is unclear whether the claims are directed to a method or an apparatus.

b. The recitation claim recites "at least one display pixels" (claim 1, lines 1-2) is grammatically incorrect. "One" cannot be correspondent with plural "pixels" as suggested. It is suggested that the term "at least one" be deleted. Please note

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that "at least one" means that it could be more than one. It does not mean that there is more than one.

c. "One at least one..." (claim 7, line 7) makes no sense. It is suggested that "at least one" be deleted so that the remaining phrase would read "one of a plurality of lens elements".

d. "Said at least one lens elementsu directed" should be changed to "said one lens elements directs" so the terminology would be consistent with what was suggested in item ^c~~b~~. above.

e. "Said elemental lens" and "the lens surface" (claim 4) lack proper antecedent basis. It is believed that they should be "said one lens element" and "the lens element surface", respectively.

f. "Said lens surface" and "said radius R" (claim 5) lack proper antecedent basis. To have proper antecedent basis, it is believed that claims⁵ should depend on claim 4 and "said lens surface" should be change to "said lens element surface".

g. In claim 6, line 2, recites "lightpipe from a said display pixel". Applicant is suggested to delete the letter "a".

h. In claim 7, line 1, "one or" should be deleted, since one element cannot form an array. Also, "Wherein" should not be written with a capital letter.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-3, 5-13 and 15-17 are rejected under 35 U.S.C. 102(a) as being anticipated by Bradley.

Bradley (US Patent Number 5,076,661) discloses a display method and apparatus to collect and project optical flux from an array (column 1, line 67 through column 2, line 3) of at least one display pixels (i.e. pitch) wherein each said display pixel can be controlled to produce optical flux (A) of variable colors or values (column 4, lines 13-21); optical flux of said display pixels is collected into at least one of a plurality of light pipes (optical media, 46); each light pipe (46) is associated with one at least one of a plurality of lens elements (32); and, at the exit of each light pipe said at least one lens elements direct said optical flux (A) to a desired field of view (column 4, lines 2-4); wherein said lens elements (32) and said light pipes (46) are integrated and are comprised of common optical medium (Figure 2); wherein said light pipe (46) is achieved as a result of total internal reflection at a high-index (column 2, lines 18-24), low-index interface along the sides of said light pipe and wherein said low-index medium is typified by air (column 2, lines 45-50); wherein said lens surface (32) is aspheric; wherein optical flux that enters the end of said light pipe (46) from a said

display pixel (i.e. pitch) passes through said high-index medium either by a direct path or by a reflection path to the refracting surface of said lens element whereupon said flux is dispersed over a solid angle (column 4, lines 22-35); wherein image-wise data presented by said plurality of pixels is projected into a visual display field (column 3, lines 56-60); wherein said light pipes (46) and lens elements (32) comprise an integrated, monolithic unit (Figure 2); wherein said light pipes (46) and said lens elements (32) are comprised of common optical material (optical media); wherein total internal reflection of flux at the light pipe (46) air-medium interface serves to collect at least a portion of flux emanating from pixels that would not directly intercept the refracting surface of an associated lens element (i.e. lenticular arrays) whereby said portion is redirected to the refracting surface of said lens elements and thereby included in displayed flux (column 2, lines 43-50); wherein lens surfaces (a, b) of said monolithic array at least approximately completely tile-the-plane of the array (30); whereby flux emanating from a pixel of extent smaller than the lens surface at least approximately fills the surface of said lens (column 4, lines 13-21).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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9. Claims 14-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bradley in view of Moshrefzadeh et al.

Bradley (US Patent Number 5,076,661) teaches the salient features of the present invention, except lens elements comprised of spherical segments and wherein said light pipes are cylindrical. However, Bradley discloses a light pipe (46) with lens elements (32).

Moshrefzadeh et al. (US Patent Number 6,636,355 B2) discloses lens elements (412) comprised of spherical segments (Figure 4) and wherein said light pipes (i.e. waveguides, 410) are cylindrical having an axis approximately parallel to the axis of said lens (412); wherein said lens elements are comprised of cylindrical segments and wherein said light pipes have an extent along the length of said cylindrical lenses whereby flux emanating from line of pixels is collected and projected for display (column 4, lines 35-43).

It would have been obvious to one of ordinary skill in the art at the time of the invention was made to utilize the lens elements and waveguides disclosed by Moshrefzadeh et al. in combination with Bradley's invention, for the purpose of changing the angular dispersion of light in one or more directions as it exits the waveguides (i.e. light pipe) to the viewer (column 7, lines 40-43).

Allowable Subject Matter

10. Claim 4 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

11. The following is a statement of reasons for the indication of allowable subject matter:

A lens focal length defined by $F = R/(1 - 1/N)$, where R is the lens surface radius of curvature and where N is the refractive index of said common medium in combination as claimed, cannot be made inherent or obvious by the prior art of record.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Miller (US Patent Number 3,218,924) discloses a screen including a large number of light guides distributed at different locations.


Miller (US Patent Number 3,279,314) teaches a tapering configuration of the light guides that enables each individual guide to pick up light from a relative large area.

Beeson et al. (US Patent Number 6,424,786 B1) shows an optical illumination assembly comprising an array of optical light guides and microlenses.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Magda Cruz whose telephone number is (571) 272-2114. The examiner can normally be reached on Monday through Thursday 8:00-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Judy Nguyen can be reached on (571) 272-2258. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


JUDY NGUYEN
PRIMARY EXAMINER

Magda Cruz
Patent Examiner
October 16, 2004